CASE STUDY

Hexthorpe, Doncaster

PILING

CLIENT

Countryside Properties

MAIN CONTRACTOR

Countryside Properties

SCOPE OF WORKS

Ground Improvement
Piling
RBL Precast Ground Beam Solution

ACHIEVEMENTS

Completed on time
Completed on budget

Project Brief

Following extensive remediation, Countryside Properties Plc have progressed the site and approached Roger Bullivant Yorkshire Ltd to provide guidance on suitable ground engineering solutions due to challenging ground conditions. The Plant works in Hexthorpe , Doncaster situated next to the river Don was once the heart of train manufacturing during the golden age of steam, the Flying Scotsman, the first locomotive to break the 100mph barrier and the Mallard the holder of the record for the fastest steam train were both manufactured here.

Estimates were subsequently submitted for foundation packages consisting of 4116No. 200mm² driven precast piles to an average depth of 12.0m and 15,392m of R400 precast ground beams and an alternative for steel tubular piles if required. An estimate was also submitted for 2183No. vibro stone columns to a maximum depth of 5.5m in areas deemed suitable.

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Key Issues/Requirements

- Extensive site investigation works carried out across the site revealed the presence of extensive made ground and obstructions associated with the old plant works that had once occupied the site. Made ground had been identified up to a maximum depth of 8.0m.
- Beneath the made ground the natural deposits consisted of interbedded sand/gravels and clays overlying bedrocks consisting of limestone, sandstone and mudstone.
- Due to the presence of a preliminary aquifer the client had submitted a foundation works risk assessment based on the use of driven piles.
- Based on the findings of the site investigation report Countryside Properties instructed their Geotechnical Engineer to formulate a Foundation Schedule / Plan pinpointing areas suitable for vibro stone columns and driven piles.
- Although extensive remediation had taken place it was apparent that a more robust pile type may be required due to the presence of obstructions.
- Countryside Properties requested an estimate for our precast ground beam solution having successfully used it on other projects and aware of the advantages it could provide in terms of speed of installation and programme requirements.

Solution

- Extensive site investigation works have identified a requirement for both driven precast concrete displacement piles and vibro stone columns.
- Due to the potential for obstructions and dense made ground an alternative estimate was provided for the installation of 140mm/178mm diameter thick wall steel tubular piles, this pile type is more robust and capable of penetrating minor obstructions.
- In total 4116No. 200mm² driven precast concrete piles are to be installed to a depth of 12.0m for a maximum safe working pile load of 325kN.
- Piles have been subjected to both static and dynamic load testing to ensure they can achieve the required safe working loads.
- 2183No. Vibro stone columns are to be installed in areas deemed suitable. The proposed ground improvement has been designed to restrict total settlements to within 25mm.
- The treatment has been designed to provide a minimum allowable capacity of 150kN/m² beneath strip foundations. Columns will be installed to a maximum depth of 5.0m.

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- A total of 15,392m of precast ground will be installed. The client selected this type of foundation solution due to many advantages that it can provide which include:
  - An integrated pile and ground beam package.
  - Greater cost certainty when compared with in-situ methods.
  - In house design by dedicated Designers.
  - Off-site manufacture within state-of-the-art manufacturing facility, which is ISO 90001, 14001 and 45001 compliant.
  - Manufactured to BS/EN 13225 & BS/EN13369
  - Setting out Engineering attendances included.
  - Speed and efficiency of installation allowing reduction in the programme.
  - Unrestricted working in poor weather conditions.
- The range of products and services Roger Bullivant Ltd have been able to provide have ensured that all aspects of our client's requirements have been fulfilled.

Construction Director at Countryside Properties said:
"Working with Roger Bullivant on our scheme at Hexthorpe has been easy and productive, working at pace with high output, Roger Bullivant have assisted delivery of the crucial triple tenure scheme .

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